REVIEWS

FLOWERING PLANTS: EVOLUTION ABOVE THE SPECIES LEVEL. G. Ledyard Stebbins. XVIII + 399 pp., 59 figs. Belknap Press of Harvard Univ. Press, Cambridge, Mass. 1974. $18.50.

This is a very exciting—and busy—time for anyone teaching advanced angiosperm morphology, phylogeny, or phylosystematics. Within the span of a few months we have seen the publication of this book by Stebbins, the 2nd Edition of Foster & Gifford (Freeman & Co.), a new look at distributions by Raven & Axelrod (Ann. Mo. Bot. Gard. 61:539-673. 1974), and a new treatment of the old Ranales by Thorne (Aliso 8:147-209. 1974). This new literature is like "new bottles for old wine," with apologies to the late Sir Julian Huxley.

Professor Stebbins has given us a fantastic book. It is full of ideas, new answers for old nagging questions, as well as new questions, and it is delightfully readable. Only a person with his vast knowledge and *understanding* of plants both living and fossil, and his understanding of genetics, developmental biology, and ecology could achieve this degree of conceptualism. As he says, it is based upon fifty years of observation, experimentation, and reading hundreds of books and journal articles.

The book is divided into two parts. The first deals with "Factors that Determine Evolutionary Trends." In seven chapters he describes the basic evolutionary processes and argues for the concept of genetical uniformitarianism and the view that the same basic evolutionary processes give rise to all taxonomic levels from the races within a species to the higher categories. Concomitantly he argues against the necessity to conjure up a mechanism such as directed mutation pressure to explain those features of higher categories that have no apparent adaptive value, and for the necessity to consider the importance of internal selection for a genotype governing a harmonious course of development. Explanations are given for the maintenance of morphological similarities or constancy of characteristics of higher categories in face of random fluctuations in the environment interacting with random mutations. Certain adaptations are discussed at length. The second part, also in seven chapters, concerns hypotheses about the origin of angiosperms and phylogenetic trends, and the adaptations of various character states. His diagram of relationships of orders, subclasses and classes shows affinities, degree of specialization, relative size of groups, and the amount of divergence within each group. The last chapter suggests kinds of research that are needed in the future. Each chapter is provided with an excellent and concise summary of the salient arguments and hypotheses.

Undoubtedly the textbooks of the future will include such items as Stebbins' "corystosperm theory of angiosperm origin," "internal selection theo-

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ry," and "principle of genetical uniformitarianism." His diagram of evolutionary relationships of angiosperm orders will be added to those by Bessey, Hutchinson, Cronquist, Takhtajan, etc. We will add to our everyday vocabulary such terms as "evolutionary cradles," "evolutionary museums," "evolutionary canalization" and others learned here. This is a monumental work which will have a tremendous and lasting impact on our field. It is indispensable to botanists and evolutionary biologists.

There are very few mistakes. My only criticism concerns the index. The book will obviously be used as a reference to Stebbins' views regarding evolutionary trends and adaptive significance of various features. Yet, the index is lacking in a number of references to such topics. For example, where is the discussion on the evolution of stipules? It could be in chapters 3, 9, 10, or 11 according to the Table of Contents. To help overcome this deficiency, a number of missing entries are given below. Some of these reflect a different choice of entry rather than a complete omission.

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